CANADA / NEW BRUNSWICK
CONSERVATION AND
ALTERNATIVE ENERGY AGREEMENT

L'ENTENTE CANADA / NOUVEAU-BRUNSWICK
SUR LES ÉCONOMIES D'ÉNERGIE
ET LES ÉNERGIES DE REMPLACEMENT

Annual Report

ENERGY EDUCATORS OF NEW BRUNSWICK

Year Ending March 31, 1988

Sponsored by: The New Brunswick Department
of Natural Resources and Energy and
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1. EXECUTIVE SUMMARY

Energy Educators of New Brunswick is an information network of volunteer members formed in the summer of 1984 and whose purpose is to advance the teaching of energy education in New Brunswick.

To help accomplish this goal, a contribution of $70,580.98 was made to EENB under the Canada - New Brunswick Conservation and Alternative Energy Agreement. The following activities were carried out under the agreement during the 1987-88 fiscal year

Energy Conservation Calendar Competition

In an attempt to heighten the awareness of the need to conserve energy, EENB produced calendars for the 1988/89 school year featuring drawings from New Brunswick students grades 4 through 6 promoting energy conservation and alternative energy.

In July, 1987, a graphic artist was hired to design the flyer advertising the calendar artwork competition. It was printed in September and sent to every elementary school in the province for grades four through six.

On January 8, 1988, a selection committee was formed of Executive Director Suzanne Hunt, Steering Committee member Nicole Ferguson, and graphic artist Matthew MacKay. On February 8, thirteen drawings (one for each month and one for the top of the calendar) were chosen from the entries.

At the end of March, 1500 calendars were printed at UniPress Printers. These will be sent to every school in the province in August.

Stratagem 1 Pilot

Stratagem is a simulation game that gives players the chance to discover first-hand the fundamentals of how a country works. It can be used to illustrate how changes in energy affect the rest of the economy. Played with a game board, playing pieces and a micro-computer program, Stratagem challenges and develops student's ability to analyze and integrate information, solve problems, plan strategies, and to debate, persuade and negotiate. The goal of the game is to achieve a prosperous and healthy economy.

The object of the Stratagem 1 pilot was to introduce teachers to the game and decide whether it could be used as a teachers aid in various senior high classes. Teachers who participated in this project all felt that the simulation was an extremely valid tool. The teachers feel students lack problem solving and critical thinking skills. Indeed this should be a common goal of all courses in the curriculum, and this simulation emphasizes the use of these skills and develops them in the student.

Symposium and Annual General Meeting

The Symposium and AGM took place in October 1987 in St. Andrew's at the Algonquin Hotel. The symposium is held each year to update teachers and energy professionals on the latest developments in the energy scene and to provide educators with classroom activities that enable them to teach what they've learned. Over 60 teachers participated in the Symposium and almost 100 per cent indicated on the evaluation form they felt the conference was a necessary annual event.

Executive Director and Steering Committee Expenses

Funds were provided for an Executive Director to oversee all the projects undertaken by EENB during the last fiscal year.

The Steering Committee met five times during the year to discuss these projects and provide guidance to the Executive Director.

Newsletters

Three newsletters were published by EENB in the last fiscal year. Each newsletter was twelve pages in length and was published in both English and French.

The newsletters contain articles on the latest innovations in the energy scene in Canada and New Brunswick and two activity pages in each one for classroom use.

The newsletters were sent to all EENB members (70 English, 30 French), every school in the province of New Brunswick (270 English, 170 French) and many other energy related organizations throughout Canada (140 English, 1 French) who have asked to be on the mailing list.

2. INTRODUCTION AND BACKGROUND

In the summer of 1984, a five-day energy education conference was held in Fredericton. From this conference, a bilingual, not-for-profit energy education organization (EENB) was founded by 35 elementary, junior, senior high school and university teachers.

EENB is an information network of volunteer members interested in advancing the teaching of energy in New Brunswick classrooms. Members share beliefs in the values of energy literacy approaches to teaching the subject of energy. They believe in the conservation ethic and in the importance of a special network of like-minded educators and energy professionals. They believe that the subject of energy can be taught at all grade levels and can be incorporated into most academic disciplines including history, economics, industrial arts, science, home economics, geography, etc.

During the first year of operation, EENB was primarily supported by the Province of New Brunswick through funding from the Canada-New Brunswick CREDA agreement. In that first year, EENB produced two newsletters and a play aimed at secondary school students. During its seven week tour, the play was presented over 90 times around the province. Follow-up materials were distributed to facilitate follow-up of the play and video tapes of both English and French plays were produced.

In the summer of 1985, EENB hosted its second Symposium for 40 delegates. At the Annual General Meeting held at this conference, delegates approved the first constitution for the organization.

In its second year of existence, EENB signed a contract with Energy, Mines and Resources for $30,000.00. The organization then proceeded to hire a full-time executive director, publish two more newsletters, and produce a second play. This play was performed for over 90 elementary school classes around the province and was again accompanied by follow-up materials which were used by almost 60 per cent of teachers whose classes saw the play.

In the fall of 1986, EENB obtained financial support from the Department of Natural Resources and Energy to extend the contract for the Executive Director and hold its third annual Symposium and Annual General Meeting. With additional support from the Department of Education, which agreed to fund supply teachers for the conference, and a contribution from NB Power, 87 delegates attended. At the Annual General Meeting, a new Steering Committee was elected and charged with a mandate to develop a two-year action plan for the organization, to seek subsistence funding from the Canada-New Brunswick Energy Agreement, and to identify other high-priority projects which EENB should undertake. Additional funding sources for other important projects were to be identified and subsequently pursued.

3. Activities

3.1 Stratagem-1 Pilot

Stratagem is a simulation game that gives players a chance to discover first-hand the fundamentals of how a country works. Played with a game board, playing pieces and a micro-computer program which mathematically models the underlying principles governing the development of a country, Stratagem challenges and develops students' abilities to analyze and integrate information, solve problems, plan strategies, and to debate, persuade and negotiate.

The goal of the game is to achieve a prosperous, healthy and environmentally-sound economy. When the game begins, the country is at a stage of development similar to that found widely in Latin America today. As the first of a number of challenges, it faces an energy shortage.

In March, 1988, eight New Brunswick teachers piloted the game in their classrooms for a two week period. The objectives of the pilot were:

1) To demonstrate the many interlinkages among issues of development, energy, and the environment.

2) To illustrate the long term consequences for the economy, the environment, and human welfare of various basic policy options.

3) To provide participants with vocabulary and concepts that facilitate comparison of the energy/environment situations in different countries.

4) To build a sense of teamwork among students with expertise and responsibilities in different aspects of the development process.

The following teachers participated in the pilot:

Grant Hendry	Blackville Rural High Environmental Science
Mary Ellen Pelletier	Miramichi Valley High Environmental Science
Bill Roderick	St. Malachy's High, Saint John Economics
Diane Gillette	Chipman High Environmental Science
Clair Ripley	Oromocto High Environmental Science

Bob Kenyon	Oromocto High World Issues
Bernice Gammon	Bathurst High Environmental Science
Nicole Ferguson	École Sainte-Anne, Fredericton Environmental Science

The teachers were then asked to evaluate the game in the following seven areas.

1) Logistical data
2) Placement in the course
3) Evaluation of the student outcome
4) Areas of concern
5) Curriculum placement
6) Suggestions
7) Reccomendations

1) LOGISTICAL DATA

SUBJECT	# OF CLASSES	# OF STUDENTS
Environmental Science 112	5	136
Environmental Science 112-3	4	81
Environmental Science 113	1	28
Economics 120	1	27
Geography 120	1	20
Totals	12	292

As one can see from the data above, the emphasis was placed in the area of environmental science; however, it was felt that other areas of the curriculum, namely geography and economics, might also benefit from exposure to this simulation.

2) PLACEMENT IN THE COURSE

The majority of the environmental science teachers in the pilot program felt that the simulation worked best when placed near the middle of the course. It would be at this point that most of the students had a fairly good understanding of the basic principles involved in the model. The economics teacher felt, as far as his students were concerned, they probably had enough economic background but would possibly need additional work on the ecological principles involved. The geography teacher felt next year he would use the game to introduce his students to the program and it's basic principles, and then again several weeks to months later to apply some of the principles taught. Several teachers commented that the game is very useful as a group dynamics exercise, ie: to get to know the students and for them to get to know each other. It was generally agreed that the present package needed some revision from year to year by the teacher to match the introductory material to the level of the student. The material should be left in it's present form though, to allow the teacher the option to vary it as he/she sees fit.

A possible alternative to the current 10 day playing cycle would be to use 15 days and analyze each cycle as it is played for cause-effect relationships. This would benefit students who would see the impacts of decisions made in each cycle sooner.

3) EVALUATION OF STUDENT OUTCOME

Teachers who participated in this project felt the simulation was an extremely valid tool. The teachers felt the areas of greatest need in the curriculum were problem solving and critical thinking skills. This should be a common goal of all courses, and this simulation emphasizes the use of these skills and develops them in the student.

Several methods were used by the teachers to evaluate progress and learning outcomes of their students. Objective questions along with subjective, analysis/application items were used very successfully. Students were asked to graph various sets of data and interpret pre-drawn graphs. In addition to these questions, the students were asked to explain their particular portfolio to the teacher. Teachers also gave the students situations and asked them what would be the best investment to achieve short and long term gain.

The end use of the simulation will to a large extent depend on the objectives of the teacher and the nature of the course material involved.

4) AREAS OF CONCERN

Minor problems of a technical nature were discovered.

-In the event that a country exceeds the maximum debt allowed, the world bank seizes 10% of the total goods at the beginning of the cycle. This in itself does not present a problem unless the "total goods" ends in a unit of 50, for example 3850. In this instance, 10% is 385, which the computer seizes. The total is reduced accordingly. The programming however, is such that a unit of 5 can not be entered. The computer will round off all such inputs up to the nearest unit of 10. This error can be corrected by installing a rounding off statement in the program.

-Many of the teachers had students that wished to exceed the 50 year limit on the game. This could be done easily also with minor revisions to the program. The justification would be to allow a group of students who had finished early to keep busy until all the students were done.

-Some of the teachers experienced problems getting the hardware needed to run the game. Initially, it was decided to purchase the hardware so teacher's would not need to interrupt other programs within the school. To economize however, computers available in the schools were used, which not all pilot teachers had easy access to.

Minor problems with the structure of the game itself also became evident. There is a reversal in the order of the energy export and energy for food and goods production decisions that caused problems for the students until they adjusted their way of making these decisions. A minor inconsistency of terms, "depreciation" versus "worn out" became evident but posed no real problems for the students. It should be stressed that these problems should in no way take away from the game. Any new project requires changes to suit the intention of the user group.

5) CURRICULUM PLACEMENT

There appeared to be no one single course chosen for this project that stands above the rest as the place for this simulation. The economics teacher felt that as a practical exercise to develop critical thinking, STRATGEM-1 is an excellent tool. The geography teacher agreed, calling it a great way to get the students to work together to really see the issues facing people of every nation.

The environmental teachers, Level II and III, were very supportive. The level II group suggested it could be used as a practical lab exercise to introduce students to the theoretical nature of global scale economics. Level III students, it was felt, would gain experience in some areas that they might not get elsewhere. For instance, Level III students are seldom exposed to the concepts of depreciation, marginally declining returns, debt management and interest accumulation, all of which play a strategic role in the performance of the team in this game.

The enthusiasm generated by Stratagem-1 was evident when the entire team would anxiously be awaiting each set of results. This level of enthusiasm is often difficult to generate.

6) RECCOMENDATIONS

Many of the suggestions the group made were of a mechanical nature ie: not dealing with the underlying principles but with the movement of the game and the layout of the board, etc. It should be noted that the teachers were not using final packages, but basic blueprints and photocopy materials.

The following are some recommendations:

A) Stratagem-1 should be included in the list of support materials approved for optional use in the following courses: Environmental Science 112-3, Economics 120, and Geography 122.

B) To facilitate the use of this game in classrooms, we would suggest that hardware be assessed and purchased or obtained as required. (Diskettes are available for the Commodore 64. Perhaps some redistribution of the present stocks of computer equipment is possible.)

C) An interscholastic "competition" be set up. It would be something along the lines of the "Reach for the Top" program but with less emphasis on the competitive aspect. The pilot teachers have tentatively agreed to bring a team of students to Blackville High School in early May to play Stratagem for an entire day. This of course is pending approval by the individual school boards for release time and availability of supply.

In closing, it should be stated that the overall impression of the people involved in this project was one of enthusiasm and a desire to see it go further. The teachers all felt that students benefitted by their exposure to this project. Their willingness to participate and eagerness to return to the game each day was evident. Their ability to comprehend the model was obvious by the scores the students acheived, in most cases the average score was in the 11.0 - 12.0 range, typical of scores produced in the game's use as a management training exercise for senior government managers. In fact, one group of students in Chipman playing the game as a noon-hour activity instead of chess, had an incredible score of 28.3 !!!

Further study as to the long-range goals and objectives of this simulation in relation to the New Brunswick curriculum is desirable, as well as a bank of evaluation items written by the teachers to meet these various objectives.

3.2 Energy Conservation Calendar Competition

In an attempt to heighten the awareness of the need to conserve energy, EENB produced calendars for the 1988/89 school year featuring drawings from New Brunswick students grades 4 through 6 promoting energy conservation and alternative energy.

In July, 1987, a graphic artist was hired to design the flyer advertising the calendar artwork competition. It was printed in September and sent to every elementary school in the province for grades four through six.

By the deadline on December 31, 1987, over 225 entries had been received from the following schools:

Rexton Elementary School	Rexton
East Dieppe School	Dieppe
East Saint John School	Saint John
Perth-Andover Intermediate	Perth-Andover
Harcourt School	Harcourt
École Centrale	Lac Baker
École Le Tournesol	Petit-Rocher
École Champlain	Moncton
École La Rivière	Pokemouche
École Nashwaaksis Memorial	Fredericton
École Régionale St. André	Grand Falls
École Abbey-Landry	Saint Joseph
Nashwaaksis Memorial School	Fredericton
McAdam Elementary	McAdam
Milltown Elementary	St. Stephen

At the EENB Steering Committee meeting on January 8, 1988, a selection committee was formed of Executive Director Suzanne Hunt, Committee member Nicole Ferguson, and graphic artist Matthew MacKay. On February 8, thirteen drawings (one for each month and one for the top of the calendar) were chosen from the entries.

The winners are:

Tricia Lynn Christie, McAdam School, Grade 6
Chris Johnston, McAdam School, Grade 6
Denis Hachey, Le Tournesol, Petit Rocher, Grade 6
Guylaine Chiasson, École La Rivière, Pokemouche, Grade 5
Vicki Boles, St. Stephen School, Grade 6
Shawn Beck, Harcourt School, Grade 4
Allison Vautour, Rexton School, Grade 4
Gabriel Vautour, École Abbey Landry, Saint Joseph, Grade 6
Kim Bentley, Milltown School, Grade 6
Annik Roy, École Petit Rocher, Grade 6
Susan Nason, McAdam School, Grade 6
Jamie Brian McMullin, McAdam School, Grade 6
Matthew Denton, Nashwaksis Memorial, Grade 4

EENB buttons were printed at Key Industries for the winners and certificates of participation and merit were drawn up on the McIntosh. These were sent to each participant.

At the end of March, 1500 calendars were printed at UniPress Printers. These will be sent to every school in the province in August.

3.3 Annual General Meeting and Symposium

More than 60 people involved in the Canadian energy education scene participated in the conference this year.

As in past years, the Symposium gathered public school and university teachers as well as government and private sector representatives from throughout New Brunswick and Canada to discuss current energy topics.

On the opening evening, delegates had the opportunity to preview a new film, "Mineral Wealth of Atlantic Canada", produced by Energy, Mines and Resources, Canada. A welcoming, get-acquainted reception followed the film.

Friday morning started off with the Annual General Meeting (AGM), where the winner's name for the EENB'er of the Year award was announced.

Following the AGM, participants had the choice of attending either a workshop on woodchip heating, given by Professor Tony Short of the Forest Engineering Dept. at UNB, or a report by Dr. Luce Gauthier on the latest thermo-nuclear fusion Tokamak, located in Varennes, Quebec. It is believed the Tokamak, which operates on the principle of magnetic confinement, is the most commercially promising method of producing a controlled, thermo-nuclear reaction.

The next session featured presentations by Ken Oakley from the Canadian Petroleum Association, Blair Kennedy from NB Power and Dr. Jean-Yves Daigle from the Peat Research Institute in Shippagan. Concurrently, P.J. Spratt & Assoc. delivered a workshop featuring fusion kits for grades 11 - 13.

The final session featured workshops on wind power, delivered by Carl Brothers of the Atlantic Wind Test Site, and nuclear energy by Dr. Dan Meneley of the Chemical Engineering Dept. at UNB.

Friday night after dinner at the golfcourse clubhouse, a film by the Ontario Ministry of Energy was shown. "The Conserving Kingdom", an energy conservation film developed for Ontario elementary schools is now available for distribution across Canada.

The conference ended Saturday morning with a tour of the Point Lepreau Nuclear Generating Station.

At the conclusion of the workshops, participants were asked to fill out evaluation forms. The summary of those forms can be found in the Appendix. Throughout the weekend commitment to energy education was apparent. Almost 75 per cent of the delegates felt the annual conference was important and wanted to see it continue.

Summary of Presentations

Wood Chip Heating

The wood chip heating workshop was presented by Professor Tony Short, who works in the Forest Engineering Department at the Universtiy of New Brunswick.

He spoke on the development of wood chips for heating purposes, the advantages of this kind of heating system and their uses for the future.

The Varennes Tokamak

The commissioning of the Varennes Tokamak is an important landmark in Canada's scientific history. In the field of fusion, (thermo-nuclear fusion specifically), magnetic confinement is one of the most commercially promising technologies. Tokamaks are the most highly developed fusion research machines of this type. The most important Tokamaks are at Princeton, in the United States, the joint European Torus in England and the JY-60 in Japan. The Varennes Tokamak produced it's first plasma on March 25, 1987.

Dr. Luce Gauthier from the Varennes plant explained to the group the process of thermo-nuclear fusion, and what it will mean to us in the future in terms of alternative energy and job-creation projects.

The Conserving Kingdom

The Conserving Kingdom is an entertaining and fast-paced children's film produced in 1986 by the Ontario Ministry of Energy. This educational film, appropriate for elementary school students, features Dudley the Dragon, whose trials and tribulations point out the importance of using energy wisely.

Jean Barnard, of the Ontario Ministry of Energy, presented the film to the delegates, and distributed copies of the resource kits made to accompany the film.

Understanding Fusion Energy

This workshop was presented by Denise Comtois of P.J. Spratt and Assoc.

A teaching aid for Grades 11 - 13 Physics/Chemistry classes, this 70-frame filmstrip with accompanying audio cassette and 20-page teacher's guide will greatly enhance the teaching of nuclear fusion.

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Conceived, designed and written by Canadian teachers, in co-operation with scientists from Canada's research industry, the material stresses the important scientific principals involved, but does not ignore the engineering design applications necessary to achieve controlled fusion conditions.

The teacher's guide contains the filmstrip narrative, additional background notes for the teacher, elaborating points made in the script, simple review questions, suggestions for further thought, and some problems (with solutions), which encourage students to derive for themselves some of the key numbers involved in fusion energy studies.

A Petroleum Overview - Exploration and Production

Mr. Ken Oakley of the Newfoundland branch of the Canadian Petroleum Association gave the presentation on the petroleum industry in Canada.

Mr. Oakley discussed the status of exploration in Canada today, and hopes for its future development. He also talked about the production end of the industry.

Orimulsion Fuel

Blair Kennedy, Program Director for the orimulsion project explained how N.B. Power has entered into an agreement with two Venezuelan oil companies, providing for the test burning of Orinoco heavy crude oil in the Power Commission's Dalhousie No. 1, 100 megawatt generating unit.

Venezuela has reserves of heavy crude comparable to the total Middle East crude reserves and is looking to develop markets for the oil. One market is the electrical utility industry. The project will provide first-hand knowledge of the technical, environmental, and economic aspects of using the Orinoco fuel for power generation.

Peat

Dr. Jean-Yves Daigle is the Director of the Peat Research and Development Centre in Shippagan. At the symposium, his workshop focused on the history, developments and uses for peat. He also spoke about the various projects that the Research and Development is undertaking at this time.

Wind Power

The wind power workshop was presented by Mr. Carl Brothers, who is the Operations Manager of the Atlantic Wind Test Site on Prince Edward Island.

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Wind Power Cont.

Mr. Brothers gave a brief history and introduction to wind energy, followed by a short film of Canadian wind research. He discussed the various projects and activities taking place at the Atlantic Wind Test Site, and finished the workshop by discussing the future potential and problems of the industry.

Nuclear Energy

Dr. Dan Meneley is the Chairman of the Department of Chemical Engineering at the Unversity of New Brunswick. He teaches nuclear engineering at the school and is a frequent speaker at conferences concerning that issue.

Dr. Meneley spoke about the nuclear situtation in Canada, its history, the differences between the CANDU reactor and other models, and the risk/benefit factor in the industry.

Focus on Fission

This workshop was presented by Denise Comtois of P.J. Spratt and Assoc.

Focus on Fission is a teaching resource for science classes for grades 11 - 13 that examines the evolution of knowledge of radioactivity and the atomic nucleus, and how these prinicples are applied in CANDU reactors.

The material consists of two filmstrips, and audio cassette, nuclide chart and a teacher's guide.

Energy Matters

This workshop was presented by Denise Comtois of P.J. Spratt and Assoc.

Energy Matters is a teaching aid for grades 9 - 11 science and environmental studies classes. The kit is comprised of three filmstrips and audio cassettes - Energy in Transition, Radiant Energy: Forms, Sources and Detectors, and the Radiant Energy Spectrum.

Comments

For the third year in a row, the EENB Symposium generated, and maintained interest in the energy education field. Every year there are more people who renew their memberships even though they are not able to participate in the symposium.

Fully 92 per cent of educators felt the conference had provided them with useful information for classroom application and almost all said they would like to see the conference continued on an annual basis.

Most of the comments were very positive. Participants were lavish in their praise for speaker content, workshops and organization.

Some educators felt that the workshops had little practicality because they were not presented in specific teacher kit format. Teacher presentations are almost non-existant so for that reason EENB selects leading professionals in the energy field to make presentations in the hope that educators will find ways to use the information in the classroom.

The participants who said location could be improved came from the Northeastern corner of the province. EENB recognizes the inconvenience of having to travel long distances but as a provincial organization must travel to all areas of the province.

The three participants who said the site could be improved were no doubt referring to a teacher/student conference that was going on the same weekend. With a student/teacher ratio of only 3/1, this left some students unsupervised. They caused quite a disturbance on the Friday night.

3.4 Newsletters

The objectives of this project were to heighten awareness of the need to conserve energy through distribution of newsletters delivered to every elementary, junior and senior high school, university and technical college in the province of New Brunswick.

Three newsletters were published by EENB in the last fiscal year. Each newsletter was twelve pages in length and was published in both English and French.

The newsletters contain articles on the latest innovations in the energy scene in Canada and New Brunswick and two activity pages in each one for classroom use.

The newsletters were sent to all EENB members (70 English, 30 French), every school in the province of New Brunswick (270 English, 170 French) and many other energy related organizations throughout Canada (14@ English, 1 French) who have asked to be on the mailing list.

4. FINANCIAL STATEMENT

STRATAGEM 1

Stratagem package (Game board, pieces, etc.)	$1,575.00
Computer leasing	$1,396.95
In-service costs (Supply teachers)	$1,317.79
Hotel (Meeting space, meals)	$1,163.77
Travel (Mileage)	$749.63
Total	$6,203.14

CALENDAR

Printing (1500 calendars)	$10,471.47
Graphics	$225.00
Misc. (Mailing tubes, postage)	$1,336.98
Total	$12,033.45

EXECUTIVE DIRECTOR AND STEERING COMMITTEE

Executive Director	Salary	$24,798.29
	Expenses	$6,325.72
Steering Committee		$3,268.87
Total		$34,392.88

ANNUAL GENERAL MEETING AND SYMPOSIUM

Hotel (Meeting space, meals and rooms)	$9,071.82
Translation	$2,521.65
Misc. (photographer)	$266.40
Total	$11,859.87

NEWSLETTER

Printing	$2,040.18
Computer leasing	$1,174.95
Software (Toner, manuals, etc.)	$2,227.60
Graphics	$315.91
Postage	$333.00
Total	$6,091.64

GRAND TOTAL	**$70,580.98**

APPENDIX I
STRATAGEM 1

ATTENTION EDUCATORS

Here is a learning tool so challenging and exciting
that students gladly give up their lunch hour for it!

I N T R O D U C I N G

STRATAGEM

The Classroom Game

A Powerful Tool For Integrative Learning
Now Available To Ontario Secondary School Teachers

Stratagem brings classes in Environmental Science, World Issues, Geography, Economics and Politics alive with new understanding.

" After you have played this game,
you will know more about how to run a country
than 99.9% of the people running countries today".

Professor Dennis Meadows, co-author
of "The Limits To Growth" and
creator of Stratagem

Ministry
of
Energy

Ontario

What is Stratagem?

Stratagem is an exciting new simulation game that gives players a chance to discover first-hand the fundamentals of how a country works. Played with a game board, playing pieces and a micro-computer program which mathematically models the underlying principles governing the development of a country, Stratagem challenges and develops students' abilities to analyze and integrate information, solve problems, plan strategies, and to debate, persuade and negotiate.

The goal of the game is to achieve a prosperous, healthy and environmentally-sound economy. When the game begins, the country is at a stage of development similar to that found widely in Latin America today. And, as the first of a number of challenges, it faces an energy shortage.

How It Works

Five players, acting as ministers in charge of separate portfolios, are jointly responsible for sustaining the growth of their country. They make decisions which affect the growth of their population and decide when and how much to invest in food, goods, services and energy. As well, they are responsible for the financial affairs of their country, including foreign trade, and for the quality of their environment.

In each of the ten rounds of the game, the set of decisions made by the cabinet influences the development of their country over a five-year period. These decisions are fed into the micro-computer and the resulting figures become the basis for the next round of play. The challenge of the game is to find a path to sustainable development over a fifty-year period.

Stratagem players become highly involved in the challenges and satisfactions of running a country. They have the freedom to implement a wide range of social and economic decisions, but they soon discover that to be successful, their actions must reflect an awareness of the many cause/effect relationships at work in the game. Much of the fun and richness of the game comes from the lively debates of the ministers as they try to assess the best course of action for their own ministries and the country as a whole.

History and Purpose

Stratagem was originally developed by a team of respected scholars and international development officials working with Dennis Meadows, co-author of the book, "The Limits To Growth" and professor at Dartmouth College in the United States.

Their original task was to find an effective way of demonstrating to Latin American development officials not only the many interconnections between all development issues but also the long-term effects of different policy options on the economy, the environment and human welfare. They created Stratagem, a game which not only fostered a much-needed sense of teamwork but which enabled players to develop programs and policies that could lead to sustainable development under any type of economic system.

The game has since been used in over thirty countries as a training tool for government officials, corporate managers, international aid officers, development experts and university and high school students.

The Ontario Ministry of Energy is now adapting and packaging Stratagem specifically for use in Ontario secondary school classrooms.

Stratagem kits will be available to Ontario secondary school teachers, free of charge, with attendance at a Stratagem workshop. Workshops commence in the spring of 1988.

INTERESTED?

STRATAGEM

CALL OR WRITE

Jean Barnard
Education Section
Ontario Ministry of Energy
56 Wellesley St. W., 10th floor
Toronto, Ontario
M7A 2B7

(416) 965-0958

Teachers Attending A Stratagem Workshop Will Receive

An attractive classroom kit, including everything needed to play:

- 4 complete game boards with gaming pieces
- master copies of handout material
- a comprehensive teacher's guidebook
- an introductory videotape
- diskette with computer software

Stratagem

Energy

Energy Production Capital

Under Construction

Producing Capital Stock

Energy Efficiency Capital

Under Construction

Producing Capital Stock

Energy for Food Production

Energy for Goods Production

Energy Available for Production

Energy for Population

To Energy for Export

Total Energy Available

Energy Carriers

Stratagem

Goods and Services

Goods Production Capital

Under Construction

Producing Capital Stock

Human Services Capital

Under Construction

Producing Capital Stock

Goods Available for Investment

Goods for Population

Population

Food for Population

Total Goods Available

Total Food Available

Stratagem

Food and Environment

Food Production Capital

Under Construction

Producing Capital Stock

Environmental Protection Capital

Under Construction

Producing Capital Stock

Stratagem

International Finance

Energy for Export

Goods for Export

Food for Export

Money for Energy Imports

Money for Goods Imports

Money for Food Imports

International Banks

Debt

Money Available for Imports

1

2

3

4

5

6

7

8

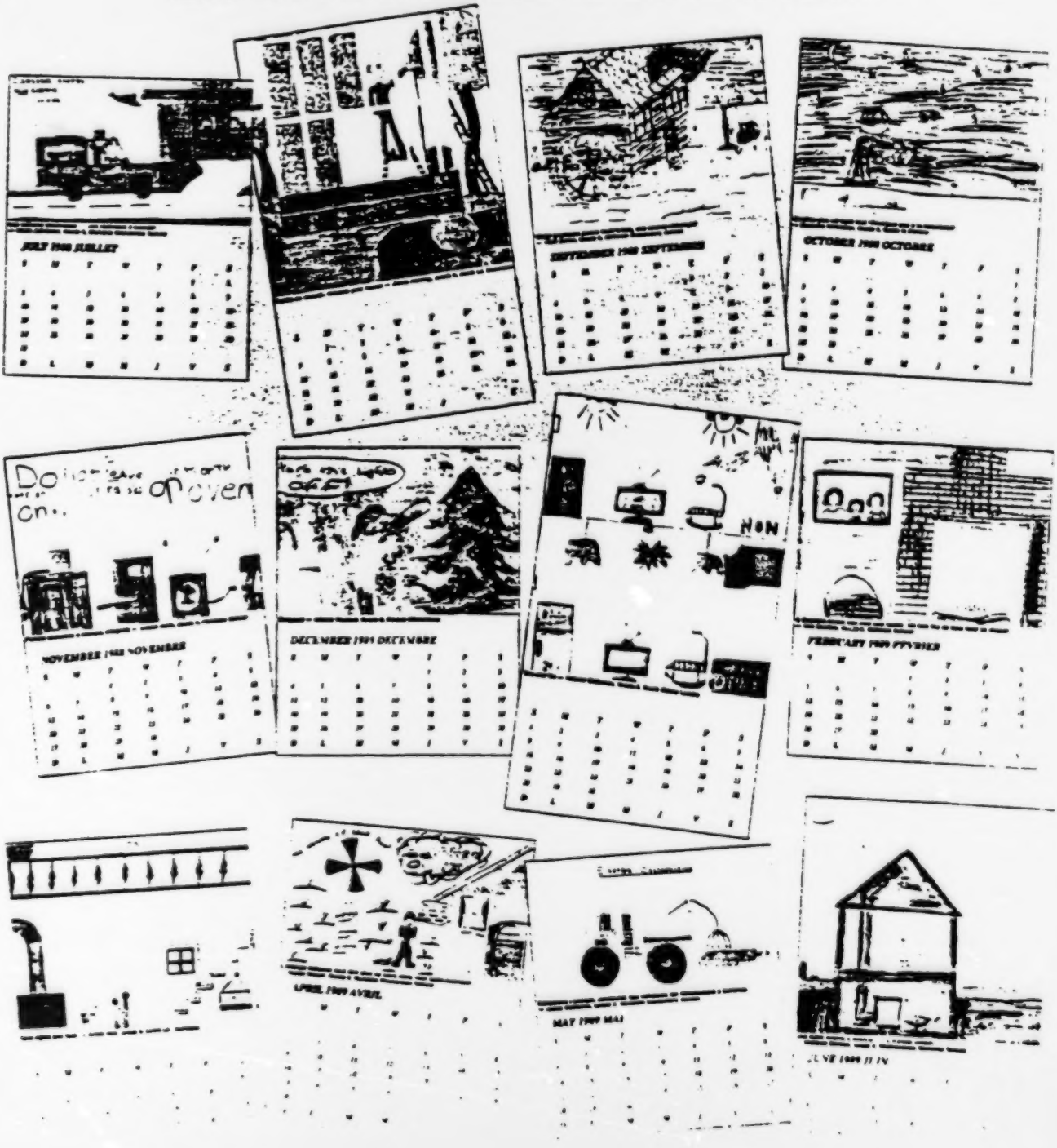
9

APPENDIX II
ENERGY CONSERVATION CALENDAR COMPETITION

ENERGY EDUCATORS OF NEW BRUNSWICK

EDUCATEURS EN MATIERE ENERGETIQUE DU NOUVEAU-BRUNSWICK

CONSERVE ENERGY
ÉCONOMISEZ L'ÉNERGIE



EENB

ENERGY CONSERVATION CALENDAR COMPETITION

1988-1989 SCHOOL YEAR

ENERGY EDUCATORS OF NEW BRUNSWICK

EENB is pleased to announce it is sponsoring the production of a 1988-89 school year calendar featuring drawings from New Brunswick students promoting energy conservation or alternative energy.

Each calendar will be 28 pages in length with the left-hand side of each page devoted to a drawing and the right featuring days of the month.

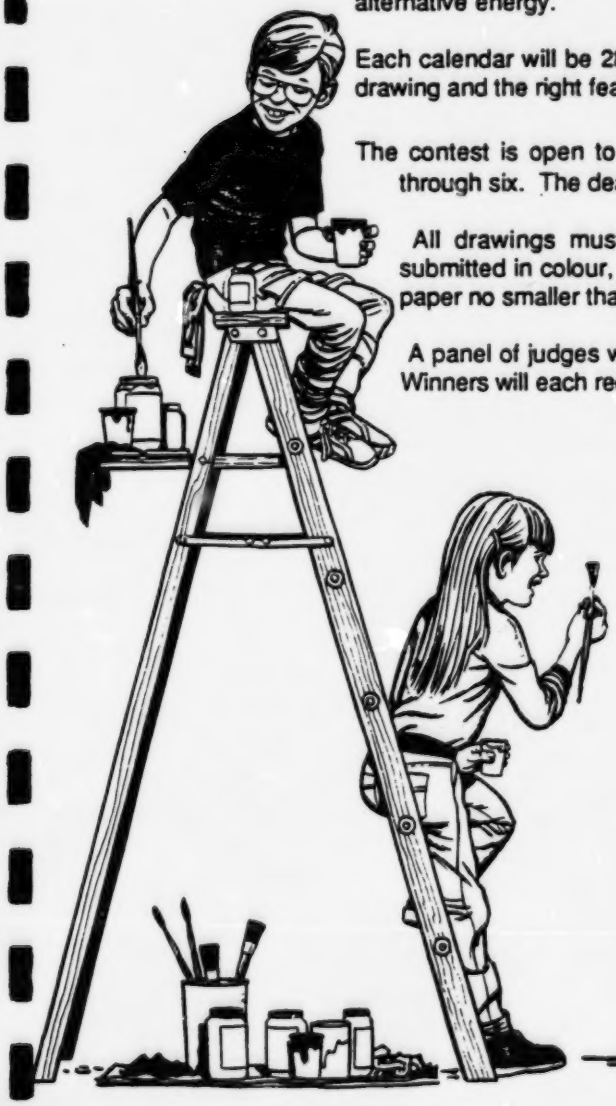
The contest is open to all New Brunswick elementary school students from grades four through six. The deadline to submit drawings is December 31, 1987.

All drawings must concern either energy conservation or alternative energy, be submitted in colour, whether in marker or crayon, and must be on a sheet of blank white paper no smaller than 8 1/2 by 11 inches.

A panel of judges will decide the best 13 drawings (12 months and one for the cover). Winners will each receive a $15.00 prize and credit in the calendar.

Please send all drawings care of:

EENB
P.O. Box 1542
Station A
Fredericton, NB
E3B 5G2



EENB

CONCOURS DE DESSIN POUR LA CRÉATION D'UN CALENDRIER SUR LES ÉCONOMIES D'ÉNERGIE

ANNÉE SCOLAIRE 1988-1989

EDUCATEURS EN MATIERE ENERGETIQUE DU NOUVEAU-BRUNSWICK

Les EENB sont heureux d'annoncer qu'ils parrainent la création d'un calendrier pour l'année scolaire 1988-1989 réunissant les dessins d'élèves du Nouveau-Brunswick dont le thème portera sur les économies d'énergie ou sur les énergies alternatives.

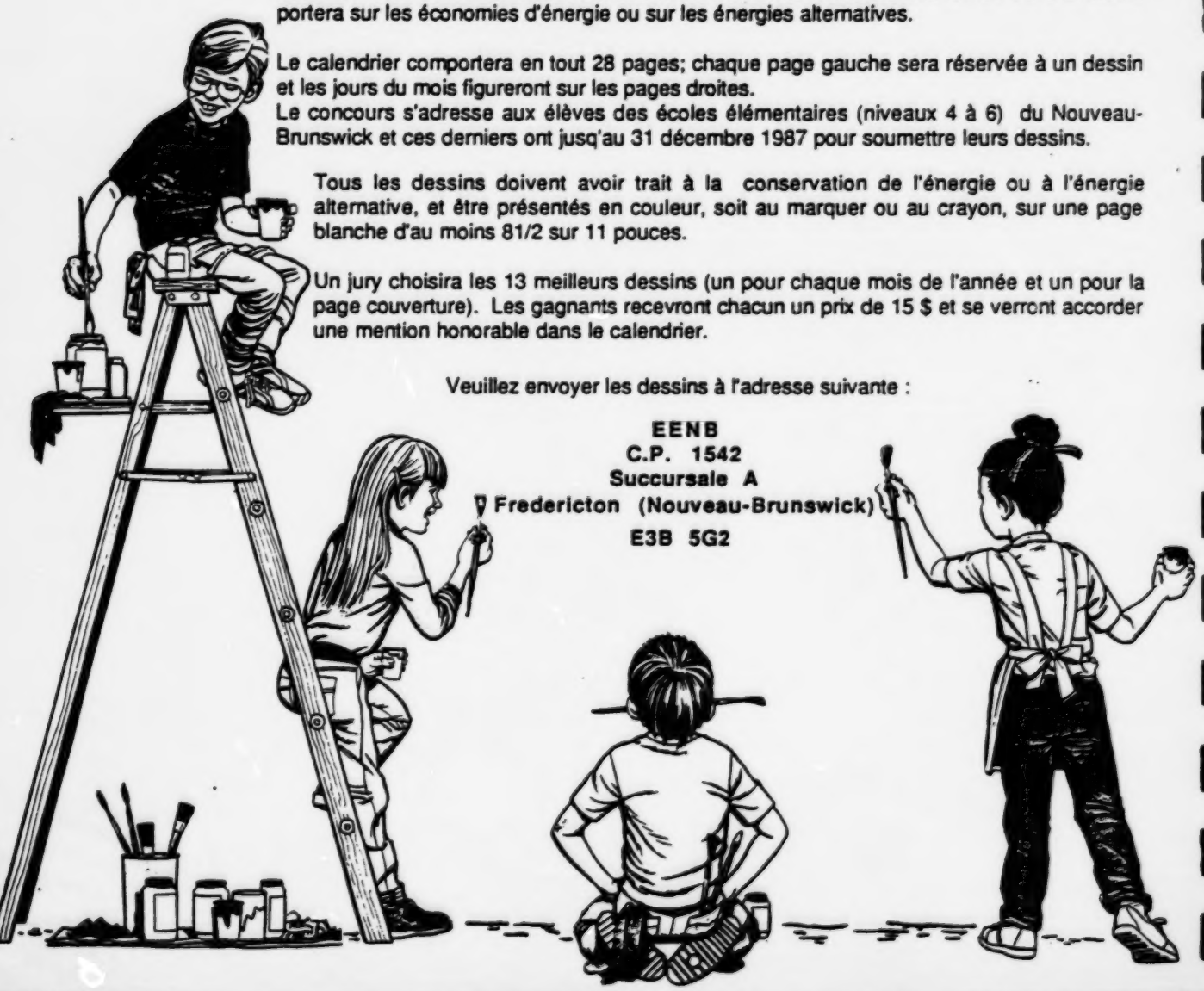
Le calendrier comportera en tout 28 pages; chaque page gauche sera réservée à un dessin et les jours du mois figureront sur les pages droites.
Le concours s'adresse aux élèves des écoles élémentaires (niveaux 4 à 6) du Nouveau-Brunswick et ces derniers ont jusq'au 31 décembre 1987 pour soumettre leurs dessins.

Tous les dessins doivent avoir trait à la conservation de l'énergie ou à l'énergie alternative, et être présentés en couleur, soit au marquer ou au crayon, sur une page blanche d'au moins 81/2 sur 11 pouces.

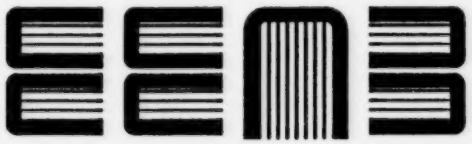
Un jury choisira les 13 meilleurs dessins (un pour chaque mois de l'année et un pour la page couverture). Les gagnants recevront chacun un prix de 15 $ et se verront accorder une mention honorable dans le calendrier.

Veuillez envoyer les dessins à l'adresse suivante :

EENB
C.P. 1542
Succursale A
Fredericton (Nouveau-Brunswick)
E3B 5G2



Energy Educators of New Brunswick



CERTIFICATE OF ACHIEVEMENT

This is to certify that_____ of_____

_____has submitted an award-winning drawing

for the EENB 1988/89 school year calendar competition.

_____

Suzanne Hunt
Executive Director

APPENDIX III
ANNUAL GENERAL MEETING & SYMPOSIUM

EVALUATION OF EENB
SYMPOSIUM 1987

	Excellent (%)	Good(%)	Could be improved(%)
Speaker content	44	54	2
Workshops	26	73	1
A.V. Presentations	37	63	
Organization	54	44	
Practicality for the classroom	18	62	20
Timing/Location	40	50	10
Site/Facilities	68	25	7
Average	41	53	.05

Has the workshop provided you with useful information for classroom application?

92% yes .08% no

In what formats would you like to continue to see information disseminated after the workshop? (Participants were allowed more than one choice).

Newsletter	25	Annual workshop	26
Semi-Annual meeting	4	Technology meeting	5
Other			

Total number of respondants 40

APPENDIX IV
EXECUTIVE DIRECTOR & STEERING COMMITTEE

EENB Steering Committee Meeting
May 22, 1987
Victoria Health Centre
Main Board Room

Present: Sydelle Grobe, Suzanne Hunt, Tony Van Dijk, Mike Halley, Léonard Goguen, Don Kelly, Bernice Gammon.

1. Call to Order: 10:10 am. The chair agreed to begin the meeting even though Sydelle Grobe and Don Kelly had not yet arrived. Sydelle had to attend to business at DNR & E and Don was supervising the science fair at his school.

2. Approval of Agenda. It was MOVED by Léonard, SECONDED by Mike THAT THE AGENDA BE APPROVED. CARRIED.

3. Approval of minutes: It was MOVED by Mike, SECONDED by Léonard THAT THE MINUTES OF THE FEBRUARY 13 MEETING BE APPROVED. CARRIED.

4. Treasurer's Report: Attached. Discussion of finances for upcoming months and recent expenditures. It was moved by Mike, seconded by Bernice THAT THE TREASURER'S REPORT BE APPROVED. CARRIED.

5. Status of Proposals: The EENB proposal is in Dieppe for federal approval. Provincial approval has been obtained. Discussion: Darwin Curtis requested information re: where Strategem will be suggested in the curriculum. The Environmental Science committee is recommending that the game be one of the four core units in the environmental science program. However, the game would be as appropriate in economics, political science or social studies courses. Hugh Duplisea and Paul Munro should be contacted to put the game on the education book list. Maurice's proposal to act as a consultant for EENB at Strategem meetings in Ontario was reviewed prior to the meeting by the Steering Committee members and discussed.

It was MOVED by Bernice, SECONDED by Mike THAT AT THIS TIME THE STEERING COMMITTEE FEELS TIME EENB IS NOT IN A FINANCIAL POSITION TO ACCEPT MAURICE'S PROPOSAL, BECAUSE IF MONEY FROM THE ENERGY AGREEMENT COMES THROUGH, IT IS DEDICATED TO PILOTTING STRATEGEM IN N.B. SCHOOLS. STEERING COMMITTEE APPRECIATES MAURICE'S CONTINUED INTEREST AND WOULD LIKE TO FEEL THAT IT COULD UTILIZE AND DRAW ON HIS EXPERTISE AT A LATER DATE AS THE NEED ARISES. CARRIED.

6. NB Power presentation: Mike recounts meeting with Dr. Terry Thompson at NB Power. EENB had approached NB Power with the idea of producing a calendar. Dr. Thompson explained that he liked the idea, but NB Power was already sponsoring four others. Dr. Thompson said that he was open to other proposals EENB might have in the upcoming months and that he was interested in meeting to discuss funding for the next Symposium.

Bernice suggests opening a picture file so if the calendar proposal is approved by DNR & E selections can begin.

DATES OF STEERING COMMITTEE MEETINGS
(Minutes attached)

May 22, 1987

July 21, 1987

Annual General Meeting, October 2, 1987

January 8, 1988

March 20, 1988

7. Strategem meeting in Ottawa and workshop at Subject Council Days: Report by Grant attached re. Ottawa. Bernice stated that the Strategem workshop at Subject Council Days was very successful - almost everyone returned for the afternoon session.

8. Office space: Executive Director of Policy, Planning and Communications has approved space for EENB at the new forestry complex contingent on funding proposal approval and available office space.

Location of conference: Suzanne reported on possible sites in Bathurst, Saint John, Memramcook and St. Andrews. Bernice suggested that Suzanne prepare a flyer for the membership advertising conference as soon as funding is confirmed. It was MOVED by Mike, SECONDED by Léonard THAT SUZANNE PROCEED WITH LOCATING THE CONFERENCE IN ST. ANDREWS IF FUNDING IS AVAILABLE. THE STEERING COMMITTEE THANKS HER FOR HER DILIGENT WORK SO FAR. CARRIED.

Consensus is that the Steering Comittee members should have more responsibility during the symposium. It is also felt that a teacher close to the conference site should be contacted for assistance. This person could act as a local representative, help set up, and deal with problems and issues that need someone "on site" before the conference. Money would be allotted for this purpose, perhaps in the form of a salary or a donation to the school.

Newsletter: Suzanne distributed latest copy of the newsletter which is the last one under the old funding. In response to Suzanne's request for comments, Bernice suggested that benefits of membership such as free newsletter and reduced rates at Symposium be included on membership coupons in succeeding issues.

Executive Director's courses: Suzanne is enrolled in two French courses which will help her to better serve the needs of EENB. She is paying for tuition and books and EENB allows her 2 hours off per day except on Friday, until June 15. Other French courses at Level 4 will be offered in the fall. It was MOVED by Don, SECONDED by Léonard THAT EENB ENCOURAGE SUZANNE TO CONTINUE WITH LEVEL FOUR COURSES ON THE SAME BASIS; SHE WILL PAY FOR HER COURSES AND EENB WILL ALLOW HER TIME OFF.

New Steering Committee members: Suggestions were offered for replacements for Maurice, Mike and Don. Mike will be on sabbatical next year in B.C., and Don will be teaching with DND in Lahr, Germany for 2-3 years. Suzanne will follow-up in order to have vacant places filled by next Steering Committee meeting.

Science Fair Prizes: Suzanne will check to see if prizes were awarded from $150 cheque sent to Université de Moncton. In future, EENB must ensure that an energy education category exists. Otherwise, candidates may not know that they are eligible to enter their projects for judging in that category. The two winners this year were in the Environmental Science category. It was MOVED by Sydelle, SECONDED by Bernice THAT EENB SEND CONGRATULATORY LETTERS TO WINNERS OF EENB SCIENCE FAIR PRIZES. CARRIED. Suzanne will send letters. It was MOVED by Bernice, SECONDED by Don THAT NEXT YEAR THE STEERING COMMITTEE SELECT 3 QUALIFIED PEOPLE ASSOCIATED WITH EENB TO CHOOSE BEST ENERGY PRIZES IN JUNIOR AND SENIOR HIGH SCHOOL

Energy Education conference in Edmonton: Date is November 17-19, 1987. Suzanne will submit names of candidates (Suzanne, Sydelle, Paul Munro, Tony) to organizer, Kathy Lyons-Zimmerman. Conference is government funded and by invitation only.

Scheduled EENB session at Subject Council: Misunderstanding between Gail and Suzanne re: cancellation. Tony explained that since Grant was doing a Strategem session there was no need for another EENB workshop.

Suzanne distributed Petroleum Research Institute's Teacher's Guide.

Don gave Suzanne printed material from workshop sessions at EEO conference which she might want to duplicate for other teachers. He commended Suzanne for telling him about environment project money which he was successful in obtaining.

Drama Festival: Two schools which submitted plays were notified of cancellation of the competition. Both plays were judged to be unsuitable because they did not deal with energy education subjects.

CNA conference in Saint John: Canadian nuclear industry is holding a conference on June 15, 1987. It was decided that nuclear energy should be addressed by EENB. EENB is not an advocacy group for any subject. It was MOVED by Bernice, SECONDED by Don THAT EENB PAY SUZANNE'S EXPENSES INCLUDING ACCOMMODATION, MEALS AND MILEAGE FOR ONE DAY, JUNE 15, OF THE NUCLEAR CONFERENCE IN SAINT JOHN. CARRIED.

Treasurer's Books: Mike and new Treasurer and Suzanne should get together to go over the books before Mike leaves.

Next meeting: To be held as soon as Suzanne hears word on the status of the proposals.

12. Adjournment: Moved by Léonard. 3:00 pm.

Suzanne Hart
Executive Director

Secretary

EENB Steering Committee Minutes
July 21, 1987
City Motel, Fredericton

Present: Marie-Berthe Losier, Suzanne Hunt, Grant Hendry, Tony VanDijk, Paul Fournier, Léonard Goguen, Sydelle Grobe

1. **Call to Order**
By Acting President, Tony VanDijk at 10:15 am.

2. **Approval of Agenda**
It was MOVED by Léonard. SECONDED by Grant THAT THE AGENDA AS AMENDED BE APPROVED. CARRIED.

3. **Approval of Minutes**
It was MOVED by Grant, SECONDED by Léonard, THAT THE MINUTES OF THE PREVIOUS MEETING AS PREVIOUSLY CIRCULATED BE APPROVED. CARRIED.

4. **Treasurer's Report**
It was MOVED by Grant, SECONDED by Paul, THAT THE TREASURER'S REPORT AS DISTRIBUTED BE APPROVED. CARRIED.
See attached financial statement.

5. **Status of Agreement**
Sydelle reviewed status of EENB proposal under the Canada/New Brunswick Conservation and Alternative Energy Agreement. The proposal has been approved for the amount requested ($75,800) for this fiscal year. Funds for the following year were not approved, because the Agreement terminates at the end of March, 1988 as of this time. The effective date of approval is April 1, 1987, so Suzanne can bill for expenses incurred this spring. Darwin Curtis (Energy Branch) will advise on eligibility regulations and the billing process. Steering Committee will receive copies of the signed contract when it becomes available.

6. **Proposals to Petro-Can and CNA**
Suzanne has submitted a proposal to Petro-Can requesting $3,000 to help defray costs of the Symposium. After being received in Halifax, the request was directed to the Montreal Branch office. Suzanne plans to visit the company to introduce EENB, subject to the company's approval of her proposal. A proposal to the Canadian Nuclear Association for $2,000 to help defray the cost of the Symposium is pending. Suzanne will visit CNA at its Toronto office on August 6 during her vacation leave (first two weeks in August).

7. **Office Space**

Due to changes in space requirements within the Communications section, Suzanne will be moving the EENB office out of the DNRE building and into the Maritime Forestry Complex core building. As before, there will be no rental charge. EENB will continue to allow DNRE personnel to use the computer and laserwriter. Sometime in the future, the Maritime Forestry Complex Corporation might charge a nominal rent for space. The move will probably take place in September.

8. **Conference**

Hotel situation-another conference (high school leadership) will be at the Algonquin at the same time as EENB. Therefore, EENB can have maximum 40 rooms. Suzanne has reserved 15 additional rooms at the Shiretown Inn. Registration materials will explain that rooms are being assigned first come, first serve as pre-registrations are received. Tony requests that Steering Committee members, organizers and speakers be accommodated in the same hotel.

Speakers-Suzanne distributed tentative agenda. (See attached.) Shaded blocks indicate speakers which still need to be confirmed. Suzanne asked for suggestions re: additional francophone speakers, speakers on topics which would balance the agenda. Suggestions: super-conductor research as applied to energy management, wind energy, do-it-yourself energy conservation techniques. The possibility of showing an Energy, Mines and Resources film on mining on Thursday evening was discussed. Sydelle will speak to Grant Yoxon, Communications Officer at EMR Dieppe about the film.

Suzanne asked for suggestions re: Saturday morning program. Aquaculture farming or program at the Huntsman Marine Laboratory were suggested.

It was decided that members should receive notification of the symposium during the summer. Suzanne will contact the NBTA and AEFNB to obtain home addresses of teachers. A flyer to be sent to the schools during the first week of August should be placed in opening packages and will serve to notify non-members of EENB about the symposium.

It was decided to supply coffee and muffins on Saturday morning and eliminate breakfast. It may be possible to serve a Brunch at 11 o'clock instead.

Registration fees will be $75 for non-members, including $5 membership, 2 breakfasts, 2 lunches, banquet and accommodation. The fee for members will be $50. No reductions for local participants who might choose to live at home.

In the future, general mailings distributed by EENB to individual schools wil' be sent to the school library instead of the Science Department or principal.

9. **Annual Meeting**

Amendments to Constitution-must clear up discrepancies in nomination process. Suzanne will check constitutional requirements for positions on the Steering Committee. Ideally, Steering Committee members can be elected at the Annual Meeting and officers can be announced on Saturday.

Executive has to study the Constitution to look for inconsistencies.

Nominations for EENBer of the Year will be gathered from Steering Committee members after lunch.

Suzanne, Tony, Grant and Sydelle should discuss AGM agenda.

11. **Energy Education Conference**

To be held in Edmonton, Alberta, November 18, 19 and 20, 1987.

Airfare to be covered by Energy, Mines and Resources.

Province of New Brunswick has nominated Sydelle, Suzanne and Tony. The Province will pay for accommodations and meals for all three.

Objective of the meeting is to increase communication among agencies involved in or wishing to become involved in energy education. The agencies invited are developing and delivering educational policy, programs or resources dealing with energy education, energy conservation, renewable energy and related topics for Grade 1-13.

12. **Other Business**

It was MOVED by Grant, SECONDED by Léonard THAT ELIGIBLE RATE OF REIMBURSEMENT FOR TRAVEL TO STEERING COMMITTEE MEETINGS BE INCREASED FROM 15¢/KILOMETRE TO 23.5¢/KILOMETRE. CARRIED.

Executive Director's contract-Members of the Steering Committee discussed offering the Executive Director a contract with the following conditions:

15% raise in salary
15% of monies fundraised
no employee benefits
no UI
for 9 months duration, beginning on the date of the expiry of the present contract
3 weeks vacation (based on 12 month contract)
1 day/month sick day, accumulate to maximum of 25 days.

The contract will be drawn up by Executive Committee in concert with the Executive Director.

ADJOURNMENT: 3:00pm.

Secretary _____ Executive Director _____

ANNUAL GNERAL MEETING
ENERGY EDUCATORS OF NEW BRUNSWICK
FRIDAY, OCTOBER 2, 1987
ALGONQUIN HOTEL, ST. ANDREW'S

Approximately 40 members present.

Chair: Tony Van Dijk, President
Grant Hendry, Treasurer
Suzanne Hunt, Executive Director
Marie-Berthe Losier, Acting Secretary

1) Call to order at 8:40 am

2) Adoption of tentative agenda.

-After a request for additions to the agenda, *Clair Ripley, SECONDED by John O'Brien, MOVED THE ADOPTION OF THE AGENDA. CARRIED.*

3) Adoption of the minutes of the last AGM.

After a call for late corrections/additions (see Other Questions), *John O'Brien, SECONDED by Stuart Mills, MOVED THE ADOPTION OF THE MINUTES.*

4) Financial status and treasurer's report.

-Treasurer's report, see attached. *Grant Hendry, SECONDED by Mary Ellen Pelletier, MOVED THAT THE TREASURER'S REPORT BE ADOPTED.*

5) Executive Director's report.

-See report attached. Executive Director read the report. Grant discussed the Strategem project. Nicole Ferguson and Don Martin volunteer to be part of pilot as representatives of the francophone districts.

Wayne Feindel, SECONDED by Gary Edgar, MOVED THAT THE EXECUTIVE DIRECTOR'S REPORT BE ACCEPTED.

6) Membership fee.

-Wayne Feindel, SECONDED by Bernice Gammon, MOVED THAT THE MEMBERSHIP FEE BE INCREASED TO $10.00.

7) Selection of new Steering Committee members.

-Suzanne Hunt, president of the selection committee, proposed that the following members be added to the Steering Committee: Nicole Ferguson, Clair Ripley, Bernice Gammon, Barrie Rigby, and Marie-Berth Losier.

THE NOMINATIONS WERE ADOPTED.

Tony Van Dijk announces that a special meeting of the new Steering Committee will be called at 4:30 pm to decide positions on the committee.

8) Science Fair Prizes

-Mary Ellen Pelletier, SECONDED by Maurice Picard, MOVED THAT THE SAME AMOUNT OF MONEY ($150.00) BE GIVEN TO THE SCIENCE FAIR THIS YEAR.

10) EENB'er of the Year.

-Michael Halley, who acted as treasurer of EENB for two years until 1987 was nominated as EENB'er of the Year.

11) Other questions.

-ARTICLE 12.2, replace the word "inequality" with "equality" in the English constitution.

-Tony Short asks if it is possible to state in the constitution that half of the Steering Committee (5 members) be re-elected every year.
The chairperson outlines that to do this, a notice of motion must be made to the members before the AGM.

Tony Short, SECONDED by Wayne Feindel, MOVED THAT THE MEMBERS BE NOTIFIED OF A CHANGE TO THE CONSTITUTION REGARDING THE ELECTION PROCESS TO THE STEERING COMMITTEE FOR NEXT YEAR'S AGM.

12) Adjournment - The meeting adjourned at 9:30 am.

Suzanne Hunt
Executive Director

Marie-Berthe Losier
Acting Secretary

EENB Steering Committee Meeting
October 2, 1987
Algonquin Hotel, St. Andrew's

Present: Suzanne Hunt, Tony Van Dijk, Barrie Rigby, Marie-Berthe Losier, Clair Ripley, Bernice Gammon, Léonard Goguen, Nicole Ferguson.

Note: This was an informal meeting of the new steering committee. As all the officers were elected by acclamation, the meeting was used to select their positions and acquaint them with standard EENB procedure.

1. Call to Order: 4:00 pm

2. Election of Officers: **Nicole Ferguson nominates Clair Ripley for Vice-President. Bernice Gammon seconds motion. Bernice nominates Tony Van Dijk for President. Nicole seconds.**

New general members of the Steering Committee are: Barrie Rigby, Marie-Berthe Losier and Nicole Ferguson.

Bernice renews her position on the Steering committe for one year. (Accepting the remainder of Mike Halley's term.)

3. Barrie Rigby adjourns meeting at 5:30 pm.

_____
Suzanne Hunt
Executive Director

0173g

EENB Steering Committee Minutes
Dept. of Natural Resources & Energy, Fredericton
January 8, 1988

Present: Suzanne Hunt, Tony Van Dijk, Marie-Berthe Losier, Clair Ripley, Léonard Goguen, Grant Hendry, Sydelle Grobe, Barrie Rigby, Bernice Gammon, Nicole Ferguson

1. **Call to Order:** 10:15 AM. Chaired by Pres. Tony Van Dijk.

2. **Approval of Agenda:** It was MOVED by Clair Ripley, SECONDED by Barrie Rigby THAT THE AGENDA FOR THE MEETING BE APPROVED. CARRIED.

3. **Approval of Minutes of meeting July 21, 1987:** It was MOVED by Nicole Ferguson, SECONDED by Léonard Goguen THAT MINUTES OF THE JULY 21, 1987 MEETING BE ACCEPTED AS CIRCULATED. CARRIED.

It was MOVED by Grant Hendry, SECONDED by Léonard Goguen THAT MINUTES OF THE OCTOBER 2, 1987 STEERING COMMITTEE MEETING BE CIRCULATED AND TABLED FOR NEXT STEERING COMMITTEE MEETING. CARRIED.

4. **Treasurer's Report:** Financial statement of EENB, period October 1 - December 31, 1987 attached. It was MOVED by Grant Hendry, SECONDED by Barrie Rigby THAT THE TREASURER'S REPORT BE ADOPTED. CARRIED.

Discussion: Treasurer responded to questions regarding revenue and expense items in his report. In reply to question from Chair, **Suzanne** agreed to ask accountant if it is necessary to separate membership fees from conference fees for purposes of audit.

5. **Treasurer's Responsibilities:** It was MOVED by Bernice Gammon, SECONDED by Barrie Rigby THAT $100.00 PETTY CASH FUND BE ESTABLISHED FOR THE EENB OFFICE. CARRIED.

The Treasurer will leave several signed cheques so that Suzanne will be able to co-sign and pay expenses which have to be made immediately.

6. **New office space:** Suzanne described move to new office space at 634 Queen Street. New phone number is 450-1581. Lack of heat is problem in present quarters. Steering Committee suggests that **Suzanne** keep EENB on waiting list for space at Victoria Health Centre and keep looking for office space in EENB's price range.

7. **Frequency of steering committee meetings:** **Suzanne** and Executive will determine number according to need (approximately 4/ year).

8. **Conference evaluations:** Suzanne referred to evaluation summaries. Participants seem to be requesting materials which are practical for use in the classroom. Indirect information which teacher can use as background is valuable, but we should try to have speakers prepare materials specific to the classroom.

Suggestions for next annual general meeting and symposium: It was MOVED by Grant Hendry, SECONDED by Barrie Rigby THAT THE NEXT AGM BE COMBINED WITH SUMMER TECHNOLOGIES SESSIONS. CARRIED.

Memberships will be valid for calendar year. At AGM there will be a registration fee. Members can renew as of October 1. Members can pay a different registration fee than non-members.

9. **Calendar competition-progress report** Deadline for drawings was December 31. Ten-twelve envelopes of drawings have been received. A committee of judges will consist of: Nicole Ferguson, Suzanne Hunt and professional artist. Calendar will be for months of August, 1988-July, 1989. It was MOVED by Bernice Gammon, SECONDED by Clair Ripley THAT ALL CHILDREN WHO CONTRIBUTE DRAWINGS SHOULD RECEIVE EENB BUTTONS. CARRIED. **Suzanne** will have buttons made.

10. **EEO-Conference in Toronto:** **Suzanne Hunt** and Barrie Rigby will attend the conference.

11. **Canadian Nuclear Association-Proposals for Funding:** Suzanne first contacted CNA in July. Met again with new staff member in early December. CNA is interested in developing teacher kits in co-operation with EENB. Teachers would be seconded by CNA for one year.

12. **Strategem - Progress Report:** Grant has contacted French and English branches of the Dept. of Education and pilot teachers re: the pilot program. Pilot teachers are in Environmental Science and Economics. For the pilot program, Grant tried to get a cross-section of the province, relevant subjects and language. Jean Barnard must be contacted by **Suzanne** to find out when the French version of the game will be available.

Grant plans to conduct an in-service, day-long session for pilot teachers. It will consist of a pre-game briefing, playing a full cycle of the game and a de-briefing session. In-service should be held February 8-9. There will be a full day and evening session on the first day and a full day session on the second. Tentative schedule to start in classrooms is February 15 through 26. A post-meeting is scheduled for March 21. School boards should submit their supply teacher fees by March 25. **Suzanne** should attend. Marc Chenard would like to sit in on the in-servicing. Paul Munro should attend in-service.

Report on project must be submitted by end of April. Grant should give the first draft to Marc by March 31. **Suzanne** will type up report on the Mac.

Dept. of Education computers will be used for Strategem. Although the Dept. has not set guidelines re: evaluation of pilot, a set of objectives should be written and pre- and post tests should be given.

13. **New Projects - Ideas - PetroCan:** 1. Energy Tour to junior high schools - PetroCan is interested in this 50 minute multi-media presentation. 2. Energy Kit for New Brunswick . It was MOVED by Grant Hendry, SECONDED by Bernice Gammon THAT BOTH PROJECTS BE UNDERTAKEN. CARRIED.

The Energy Tour proposal has to be sent to PetroCan by Monday, January 11. An ad hoc committee was established for Energy Kit project: **Suzanne Hunt**, Clair Ripley with power to add Nicole Ferguson. Both projects will be bilingual. Both are high profile.

Newsletter: French version delayed because of the move. It will be delivered to the graphic artist by Wednesday.

14. **Laser Writer - Fees for Usage:** Fees for outside organizations are: $1.00 per printed page, $25.00 per hour on terminal.

15. **Membership cards:** It was agreed to continue use of cards. Cards are mentioned in Consititution and cannot be discontinued until change is made at an AGM.

Suzanne will investigate costs of lapel pins, pens etc for students who enter calendar competition. They will also receive a certificate of participation which **Suzanne** will design.

16. **Michel Bois - Quebec:** It was MOVED by Clair Ripley, SECONDED by Bernice THAT FRANCOPHONE MEMBERS OF EENB FORM A SUB-COMMITTEE TO MEET WITH BOIS. THEY WILL ADVISE WHETHER EENB SHOULD LIAISE IN SETTING UP APPROPRIATE FRANCOPHONE EXTRACURRICULAR ACTIVITIES IN N.B. THROUGH THE CONSEIL DE DÉVELOPPEMENT DU LOISIR SCIENTIFIQUE. CARRIED.

17. **Meeting in Edmonton in November:** Tony Van Dijk, Suzanne Hunt and Sydelle Grobe attended a national, 3 day energy education conference in Edmonton in November. Prof. Jim Dunn, University of Alberta School of Business spoke about marketing strategies for education programs. Dr. Heidi Cass, University of Alberta, Science Education spoke about bringing more information on technology into the classroom. She also cautioned that teachers may be over-estimating their students' levels of understanding in science, based on recent evaluations. She advocated re-education of science teachers in industry along internship model and suggested bringing economic considerations into science studies.

Statisitcs and copies of speeches will be sent to Steering Committee members after they are received.

Only Ontario and N.B. have energy education networks.

A lot of politics involved in implementation of federal programs.

EEO meeting in February 25-27, 1988 in Scarborough, Ontario will examine future of national energy education meetings.

18. Other: Energy Options conference in Montreal: This was the culmination of a series of seminars that had run through the spring and summer. EMR had offered to pay expenses, but EENB had the money in its budget to cover costs. This was a conference to find out the state of energy in Canada. Suzanne was the only education representative at the conference. She made alot of contacts.

Re: Summer EENB meeting: Clair Ripley suggested a noon Thursday to noon Friday format. The program will contain an overview of the international, national and provincial energy scenes.

Next meeting: Sunday, March 20, 1988

Adjournment: Clair Ripley

Sydelle Grobe
Secretary

Suzanne Hunt
Executive Director

Barrie Rigby

EENB Steering Committee Meeting
March 20, 1988
Howard Johnson's

Present: Tony VanDijk, Suzanne Hunt, Léonard Goguen, Clair Ripley, Bernice Gammon, Marie-Berthe Losier, Sydelle Grobe, Nicole Ferguson. Absent: Grant Hendry, Barrie Rigby.

1. Call to Order: 12:35 pm. Chair: Tony VanDijk

2. Approval of Agenda: It was MOVED by Clair Ripley, SECONDED by Léonard Goguen, THAT THE AGENDA FOR THE MEETING BE ADOPTED. Carried.

3. Approval of Minutes of January 8 meeting: It was MOVED by Clair Ripley, SECONDED by Bernice Gammon, THAT MINUTES OF THE JANUARY 8 MEETING BE APPROVED AS CIRCULATED. Carried.

4. Approval of Minutes of October 2, 1987 meeting: It was MOVED by Marie-Berthe Losier, SECONDED by Nicole Ferguson, THAT THE EXECUTIVE DIRECTOR RECONSTRUCT THE MISSING MINUTES OF THE OCTOBER 2 MEETING AND THAT THE MINUTES BE ACCEPTED AS RECONSTRUCTED. Carried.

Discussion: The objective of the meeting was to elect officers. Business arising from the minutes should be included on subsequent Steering Committee agendas.

5. Treasurer's Report: Chair suggested that due to the Treasurer's absence the report be tabled until the next meeting. An unofficial report is attached for information purposes only.

6. Executive Director's contract: It was MOVED by Clair Ripley, SECONDED by Léonard Goguen, THAT PENDING DISCUSSION BETWEEN THE PRESIDENT AND EXECUTIVE DIRECTOR CONCERNING ISSUES MENTIONED BY THE STEERING COMMITTEE, THE EXECUTIVE DIRECTOR'S CONTRACT BE APPROVED AS AMENDED. Carried.

7. Permanent employee status: It was MOVED by Bernice Gammon, SECONDED by Nicole Ferguson, THAT THE EXECUTIVE DIRECTOR RECEIVE PERMANENT EMPLOYEE STATUS. Carried.

8. Conference: It was MOVED by Nicole Ferguson, SECONDED by Bernice Gammon, THAT THE NEXT SYMPOSIUM BE HELD ON THE FRIDAY FOLLOWING EASTER MONDAY, 1989. Carried.

It was suggested that Suzanne investigate cost of holding the Annual General Meeting (1988) during the summer, including a dinner dance on the Pioneer Princess. Suzanne should look into moving the Symposium to central N.B. for 1989. Information should be brought to the next Steering Committee meeting.

9. Photocopier: It was suggested that Suzanne investigate sharing the capital cost of a photocopier with another organization, such as Capital Development Commission or Road Builders Association. Perhaps, Education Department would allow EENB to use photocopiers there. Also, Suzanne should find out if a photocopier can be bought on last year's budget.

10. LaserWriter upgrade: This is necessary to enable programs to run correctly. It will cost $1,800 and can be paid for out of Agreement money.

11. Calendar: It is at the printer. EENB buttons (250 for $80) and certificates of participation have been prepared for the children who entered drawings in the contest.

Nicole, Suzanne and Matthew MacKay selected 13 drawings from among entries for the calendar. The format will be a poster instead of a book. It is similar to the Manitoba poster calendar. Printing costs have escalated since the proposal was written and the lesser cost of the poster will enable the project to remain within budget. The calendar will be from July 1988 through June 1989. Two thousand posters will cost $6,000. Mailing tubes have to be purchased. It was suggested that the calendars be mailed to teachers during mid-August. They should be mailed to specific science teachers in each school.

12. Halifax: Suzanne asked permission to attend a one day meeting in late March or early April concerning the national energy education network. Participants will work on establishment of a regional chain newsletter for N.B., N.S., P. E. I. to be published in May and November. Province says its O.K. for Suzanne to go as long as national work doesn't interfere with provincial responsibilities. Consensus that Suzanne should go to the meeting.

13. EEO Conference in Toronto: It was MOVED by Bernice Gammon, SECONDED by Clair Ripley, THAT THE REPORT FROM THE CONFERENCE BE TABLED UNTIL THE NEXT STEERING COMMITTEE MEETING. Carried. Suzanne will report as well as Barrie Rigby, who will describe teaching materials distributed at the Conference.

14. Michel Bois: Michel will be in Moncton on May 5-7 to discuss science fairs with francophone representatives on Steering Committee. Suzanne will contact Nicole, Marie-Berthe and Léonard.

15. Newsletter: Will be at the printer by the end of March and will be billed in time for this year's budget. Alot of EMR material which Suzanne brought back from the EEO meeting will be included. It was suggested that Suzanne contact Grant Yoxon (EMR-Dieppe) regarding discrepancies between French and English text quotes on figures for small hydro.

16. Science Fair at UNB: EENB will be presenting 2 $50 prizes to junior and senior winners in the Conservation and Renewable category. Suzanne will send EENB buttons and certificates to the winners' teachers for presentation in class. She will also include EENB literature for the teacher in the mailing.

17. Other: Chair suggested compiling a long term (5 year) financial plan for EENB and develop the plan so that money can be dedicated to separate projects. Steering Committee members were in agreement.

The new office address is : 606 Queen Street, Suite 11, Fredericton. The mailing address remains the same. EENB has a 1 year lease. Rent is $365 per month unlighted, heat and hot water included. NB Power required a $100 deposit for the new office.

The LaserWriter brought in over $300 in user fees since the last Steering Committee meeting when approval was granted to charge.

There is a 9:00 am. meeting on Monday, March 21 for Strategem evaluation.

Next meeting: Tentatively, May 27. There may be an Executive meeting on the budget for the evening of May 26. Suzanne will be in touch.

Adjournment: MOVED by Léonard Goguen. 3:20 pm.

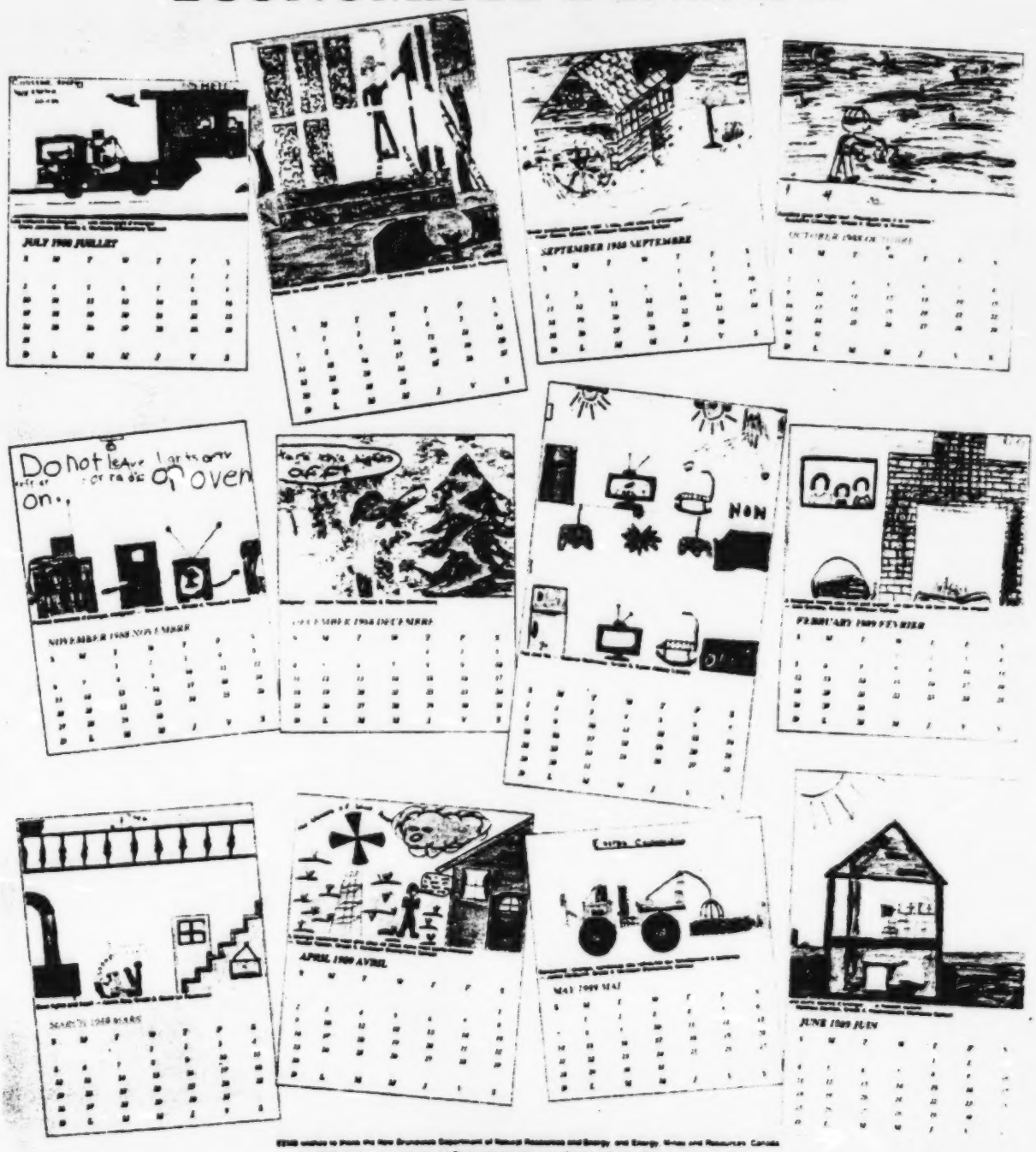
Suzanne Hunt	Sydelle Grobe
Executive Director	Secretary

APPENDIX V
NEWSLETTERS

VOLUME FOUR ISSUE ONE SUMMER 1988 ISSN 0826-9238

EEENB News

CONSERVE ENERGY
ÉCONOMISEZ L'ÉNERGIE



EEENB wishes to thank the New Brunswick Department of Natural Resources and Energy and Energy, Mines and Resources Canada
Les EEENB remercient les ministères des Ressources naturelles et de l'Énergie et Énergie, Mines et Ressources Canada

ENERGY EDUCATORS OF NEW BRUNSWICK

RENEWABLE ENERGY IN CANADA ...

Although not a major supplier of our electrical needs now, renewable energy remains one of the most promising sources to meet these needs in the future. Canada, which is committed to a national energy conservation policy, possesses abundant sources of renewable energy. Though not yet cheap enough for mass energy production, in time, it will be a clean and efficient energy source.

This issue of EENB News focuses on several renewable energy sources. Most of the information has been taken from "Renewable Energy: The Canadian Option", published by the Canadian International Development Agency. Additional copies can be obtained through CIDA.

All renewable energy originates from the sun. Of the solar radiation that reaches the earth, some is stored in plant material, some creates air currents and some gives rise to flowing water. Solar energy can also be captured directly and converted into heat or electricity.

Over the last decade, Canada has recognized the potential contribution of renewable energies and has developed manufacturing and technical capabilities in biomass, wind, small hydro, solar thermal and solar electric (photovoltaic) technologies. Hand in hand with this involvement is a national commitment to energy conservation. As valuable as any new energy source, conservation techniques enable us to use energy more efficiently.

For many of the same reasons that small-scale renewable energy installations are good for Canada, they are also good for developing countries. Renewable energy is clean, economic and not susceptible to external supply distributions. It is well suited to a

wide variety of applications, including remote locations, and projects can often be implemented with very short lead times. Wind generators and small hydro turbines, for example, can be assembled and operating in a matter of months. By contrast, large conventional energy projects are capital intensive and may have lead times of ten years of more.

Though there is more than sufficient energy from the sun to meet the world's current energy needs, this immense resource has remained largely untapped to date. But now, Canadian companies have joined together with their federal and provincial governments to develop and upgrade an unprecedented number of conservation and renewable energy products and technologies. These companies offer world class manufacturing capabilities, services and expertise.

Increasingly, developing countries are looking to conservation and renewable energy technologies to help meet their domestic energy requirements and reduce the burden of importing costly fossil fuels. We hope they will find Canada and Canadian firms helpful partners in putting conservation and renewable energy to work as part of their nation's energy strategy.

COMMENTS

EENB News is interested in your ideas. If you would like to comment on an article or submit a piece of your own, contact us at:

EENB
Attn: Editor
P.O. 1542, Station A
Fredericton NB
E3B 5G2

Statement of Purpose

EENB is an information network of volunteer members interested in advancing the teaching of energy education in New Brunswick. Members share common beliefs in the values of energy literacy and holistic approaches to teaching the subject of energy. They believe in the conservation ethic and in the importance of a special network of like-minded educators and energy professionals.

CREDITS

EENB News is published three times per year. Additional copies can be obtained through EENB.

Senior Writer:
Suzanne Hunt

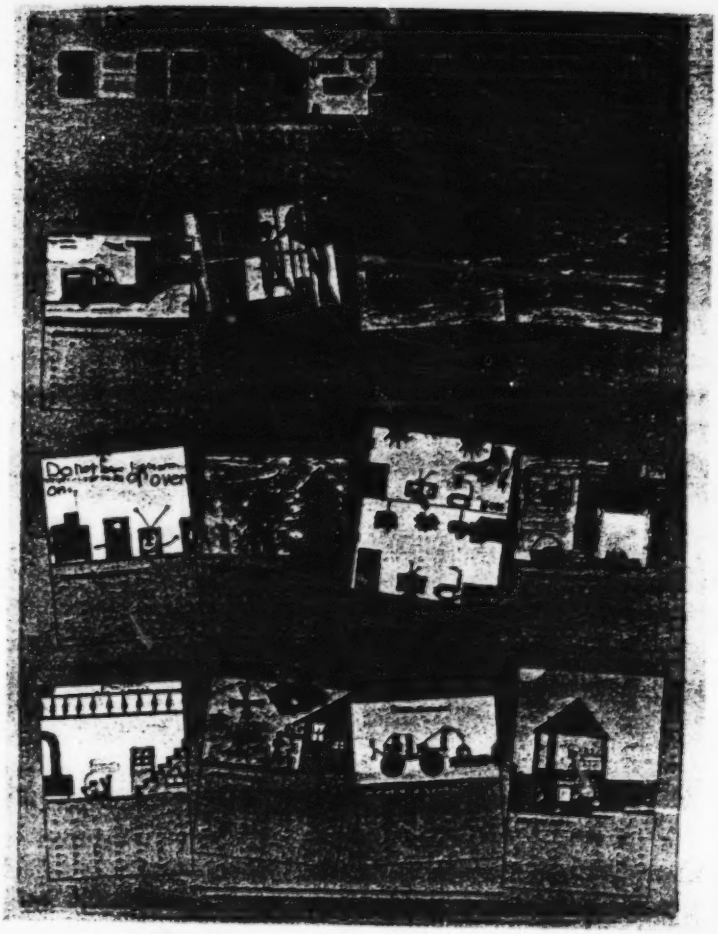
Graphics:
Mw. MacKay

Contributors:
Sydelle Grobe
Marie-Berthe Losier

EENB wishes to thank the Department of Natural Resources and Energy and Energy, Mines and Resources, Canada.

ARTISTS OF THE YEAR

Congratulations to the 13 grade 4 to 6 students who submitted the winning drawings for the 1988/89 school year calendar competition! The calendar posters will be sent to every school in the province in July. Additional posters can be obtained by contacting **EENB**.



NAME	SCHOOL	GRADE
Shawn Beck	Harcourt School	Grade 4
Gabriel Belliveau	École Abbey Landry, Saint Joseph	Grade 6
Kim Bentley	Milltown School, St. Stephen	Grade 6
Vicki Boles	Milltown School, St. Stephen	Grade 6
Guylaine Chiasson	École La Rivière, Pokemouche	Grade 5
Tricia Lynn Christie	McAdam School	Grade 6
Matthew Denton	Nashwaaksis Memorial, Fredericton	Grade 4
Denis Hachey	Le Tournesol, Petit Rocher	Grade 6
Chris Johnston	McAdam School	Grade 6
Jamie Brian McMullin	McAdam School	Grade 6
Susan Nason	McAdam School	Grade 6
Annik Roy	École Le Tournesol, Petit Rocher	Grade 6
Allison Vautour	Rexton School	Grade 4

PHOTOVOLTAICS

Photovoltaics is a phenomenon in which specialized solar cells made of silicon convert sunlight directly into DC electricity. It takes its name from*Photo*, a Latin term, meaning light, and *voltaic*, for the Italian physicist Volta who invented Volta's pile, a stack of disks of two different metals with an electrolyte in between.

Photovoltaic (solar) cells or wafers are capable of converting anywhere from 5 - 16 per cent of the sun's light energy directly into electricity. They have no moving parts, use no pumps or pipes, are modular, reliable and simple to operate, have no fuel cost and use an inexhaustible renewable energy resource.

In 1984, the total world trade in photovoltaics from the United States, Japan, Europe, Australia and Canada reached about 19 MW, an increase of 20 per cent over 1983. This represents about $150 millionUS worth of business and puts the cost of solar electricity at about $7.20 per installed peak watt, down by 60 per cent from $17.75 per peak watt in 1980.

There are currently some 2,100 PV installations operating in Canada ranging in size from five to 4,000 watts peak. Most of these are in remote locations including:

-820 systems purchased by the Canadian Coast Guard for use as navigational aids in the form of lights or beacons.
-a 2.2 kW flashing warning strobe light at a small community airport just west of Ottawa.
-numerous radio repeater stations operated by government departments, utilities and private television stations.

and, a new photovoltaic power system for Canada..

Jack Shields, Parliamentary Secretary to The Honourable Marcel Masse, Minister of Energy, Mines and Resources has announced the opening of a Canadian-designed photovoltaic power system that provides electricity to the Baxter Interpretive Centre in Kars, Ontario.

The centre is an outdoor educational facility operated by the Rideau Valley Conservation Authority. It receives more than 7,000 visitors a year.

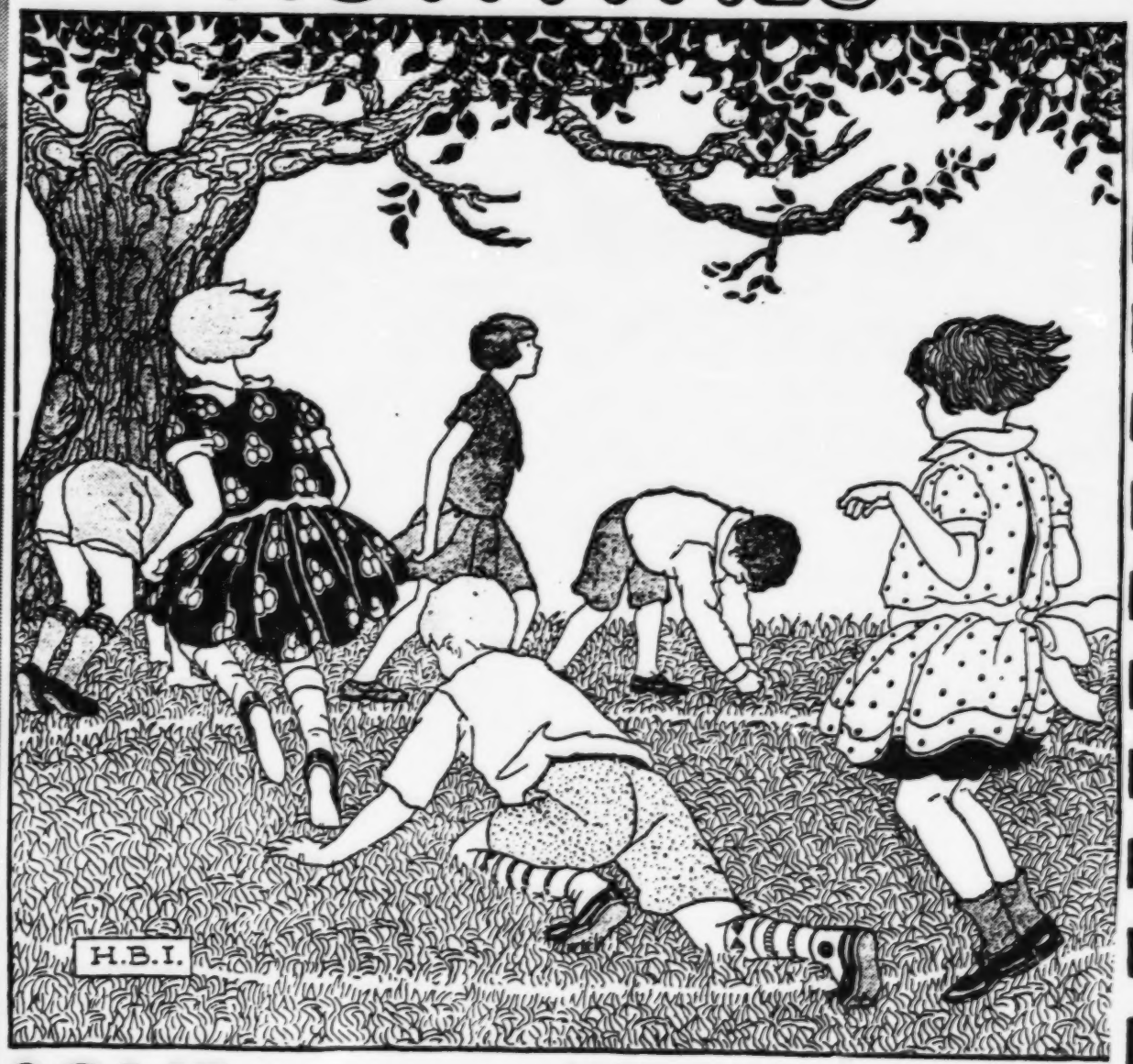
"The popular centre will provide an excellent opportunity to show the public how this technology works and will also serve as a showcase for the Canadian photovoltaic industry to market its products abroad," Mr. Shields said. "Projects like this are proof of the ability of Canadian companies to produce competitive renewable energy products intended for the export market."

This photovoltaic demonstration project was partly financed by Energy, Mines and Resources Canada through a contribution from the Enerdemo Program.

Canadian firms active in photovoltaics

Bestek Micro Devices & Systems Inc.	Ottawa, ON
Solarpac Energy Systems Inc.	Mississauga, ON
Lenbrook Industries Ltd.	Scarborough, On
TPK Solar Systems	Nepean, ON
Silonex Inc.	Montreal, PQ

-ACTIVITIES-



SOME THINGS ARE RENEWABLE AND OTHERS ARE NOT

STEP ONE

Ask the students, "What body parts do you have that are renewable?" They might think of hair, nails, skin and blood cells. "Have you any body parts that are not renewable?" They might include a finger, a permanent tooth, or other body parts.

"Some of our clothes are made from renewable materials. Which do you think would be renewable?" Clues: Remember, hair is renewable.

b) Get examples of renewable fibers, fabrics or materials used in garments. They would include cotton, wool, silk, leather. Non-renewable materials would include nylon, orlon, rayon, plastic (as in buttons and zippers), polyester and other man-made fabrics.

c) Are the foods we eat renewable or non-renewable? (Note: Our foods are produced by living things and are therefore renewable.)

STEP TWO

Homework assignment: Have students bring to class examples of materials that are renewable. Some things should present problems in classifying; for example metals or glass which can be melted and reused may be considered renewable, but they are being used again rather than replaced.

a) Examine the materials brought in by the class and determine the categories in which they fall.

STEP THREE

Having established what is meant by renewable and non-renewable, point out that these terms may apply to energy as well as to materials. List energy sources on the board and have the class decide which belong in each of the two catagories. Students may need to look up the information in reference books in order to decide on the category. Energy sources might include: Sun, Oil, Coal, Natural gas, Nuclear fuel (Uranium), Wind, Tide, Biomass, Refuse, Geothermal, Water.

Suggested Assessment Procedure

Given a list of resources, the student will be able to classify those that are renewable and non-renewable.

Taken fromEnergy and Man's Environment, Oregon

WHAT AM I?

1. I make energy from the wind. I am a _____ .

2. I come from the sun and can warm your house even in the winter. I am called _____ _____ .

3. I come from oil. I help cars and trucks run. I am called _____ .

4. I am energy that comes from the tides. I am called _____ .

5. I am hard and black and produce heat when I am burned. I am called _____ .

6. I am brown on the bottom and green on top. I produce heat when I am burned. I am a _____ .

7. We are the kind of energy which need never run out. We are called _____ forms of energy.

8. There is only so much of me. Some day I will run out. I am called a _____ form of energy.

9. Canadians should use all forms of energy _____ .

RENEWABLE	SOLAR ENERGY
COAL	TIDAL POWER
WINDMILL	NON RENEWABLE
GASOLINE	TREE
WISELY	

BIOMASS

The sources of biomass for energy applications are almost endless. They include grass, trees, plants, manure, algae, water hyacinths, sea kelp, forest residue, urban waste, farm waste, potatoes, sugarcane and corn. In fact, bioenergy can be derived from anything living or organic, and the energy equivalent of the annual net growth of biomass in all its forms has been calculated to be about ten times the current total world energy production.

In addition to the direct combustion of biomass, useful fuels such as ethanol, charcoal, methane and synthetic oils can be produced. At the same time, valuable byproducts such as animal feeds, fertilizers and chemicals can often be created.

In Canada, four per cent of the countries energy supply is derived from forest biomass. This figure does not include the heat energy delivered by thousands of domestic wood-burning units, but reflects energy consumed by the forest industry itself. By burning spent pulping liquor and wood waste, Canada's forest industry supplies more than 40 per cent of its own energy requirements.

Forest biomass includes not only the raw wood, but the branches, tops and cull trees as well as sawdust, liquors and other milling residues. It has been estimated that the unused biomass associated with conventional logging and milling activities in Canada each year contains the energy equivalent of some 120 million barrels of oil.

Conversion Technologies

There are essentially two ways to transform biomass into usable energy - biothermal conversion and biochemical conversion.

The first method uses heat - sometimes in the absence of air - to produce a reaction. The most common form of biothermal conversion is direct combustion, usually wood burning. Other methods include gasification, (producing gaseous fuels), and pyrolysis (producing gases or charcoal).

Biochemical conversion is a process in which biomass is treated with microorganisms, enzymes or fungi. Anaerobic digestion (producing biogas) and fermentation (producing ethanol) are two examples of this type of conversion.

Bioenergy can be used for a variety of applications including steam and electricity generation, space and water heating, process heat, mobile and stationary engines, gas turbines and cooking. In addition, the use of waste biomass helps reduce disposal problems associated with industrial, municipal and agricultural activities.

Though there are a number of questions still to be answered relating to land usage, harvesting, transportation, storage and emissions, these are being dealt with through ambitious Canadian demonstration programs and ongoing research and development.

Canadian firms and organizations active in biothermal conversion

Biodev International Inc.	*Montreal, PQ*
Omnifuel Gasification Systems	*Toronto, ON*
Robert Bell Industries Ltd.	*Seaforth, ON*
The Canadian Boiler Society	*Toronto, ON*
The EnerCan Group Inc.	*Willowdale, ON*

Canadian firms active in biochemical conversion

General Iron Works Ltd.	*Longueuil, PQ*
Northwest Food and Fuel Corp.	*Kerrobert, SK*
Harvest Fuels Ltd.	*Toronto, ON*
Stake Technology Ltd.	*Oakville, ON*
Iotech Corporation Ltd.	*Ottawa, ON*
St. Lawrence Reactors Ltd.	*Missassauga, ON*
Labatt Brewing Co. Ltd.	*London, ON*

PEOPLE

Marie-Berthe Losier sits at her desk, staring at the letter in front of her with a look of resignation and a smile on her face and says: "I'll have it translated for you this afternoon".

In her year and a half as the only francophone information officer for the Department of Natural Resources and Energy, Marie-Berthe often does things that aren't required for her to do. But then again, that's her nature.

Dedicated to furthering French culturalism in New Brunswick, she has worked in print and television, and given much of her free time to volunteer work. In fact, when she first started with the department, she was working at two other jobs! The first was as an information officer with the "Centre communautaire Ste.-Anne" in Fredericton, a position she held for two years. The second was as producer for the French general interest television program "Sur Vol", which covered a wide range of topics.

"I took this job with Natural Resources and Energy because the job appealed to me and because I wanted to help insure access to bilingual information in the department", Marie-Berthe says.

Since last October, Marie-Berthe has also been part of the EENB Steering Comittee. In that capacity she occasionally pinch-hits for last minute translations. As EENB is a bilingual organization, and all materials are printed in both official languages, she and the other French steering committee members also provide valuable insight into the educational needs and wants of a culture that is often overlooked because of its minority status.

"I really like this job", Marie-Berthe says. "I get to meet lots of interesting people, travel around the province. I knew when I came to the department I would be the only Francophone information officer. I consider it a real challenge!"

Remember...EENB'S new phone number is 450-1581

NUCLEAR FUSION

The warmth of a summer's day comes from the energy produced in the sun when hydrogen atoms fuse together. Why not try fusion on earth? The sorts of hydrogen that provide the fuel for fusion are virtually limitless. One gallon of sea water could in theory produce as much electricity as 300 gallons of petroleum.

Fusion happens only under extreme conditions. In order to fuse, hydrogen must be both hot and dense, as it is in the sun or an exploding hydrogen bomb. In a fusion reactor it will be less dense, and must therefore be heated to 100 million°C, ten times the temperature in the stars. Such hot hydrogen is in matter's fourth state, after solids, liquids and gases, called plasma.

The history of fusion is the history of controlling plasmas. Since the 1950's researchers have concentrated on trying to wrap up plasma in powerful magnetic fields so that it is held steady and does not lose heat when it touches the walls of the reactor vessel.

The most popular design of reactor is the tokamak, which was invented in Russia in the 1960's. The tokamak involves closed magnetic confinement of the plasma in a doughnut-shaped chamber called a "torus" maintained at a high vacuum. The magnetic field produced acts like a magnetic bottle to contain the plasma so that it does not touch the walls of the reactor. Canada has a medium-sized tokamak at Varennes, Quebec and a small experimental tokamak in operation at the University of Saskatchewan in Saskatoon.

There was a heady moment in the 1950's when electricity from fusion promised to be clean, cheap and infinitely abundant within 40 years. The vision has receded and tarnished since. In the late 1980's the mirage still hovers, 40 years away; and, while it still promises to be an inexhaustible supply of electricity, this power will not be clean or cheap.

Fusion does have real attractions. It will not produce waste gases in quantities large enough to affect the world's climate. Uranium and plutonium, the dangerous fuels and products of fission , will not be found anywhere near a fusion reactor. Above all, a fusion reactor contains only a little of its fuel at any time; so it cannot run amok as have fission reactors at Three Mile Island and Chernobyl.

But these theoretical advantages will remain a mirage until fusioneers determine two things. First, cost: what spending could put fusion into the heart of a commercial power station? At the moment, nobody has any idea. The hope is that the capital cost of a tame sun can be kept low enough to provide electricty at around the same price as from other sources: but even fusion's supporters admit that the price could be ten times higher.

Second, and clashing with most people's perception of fusion power, is the amount of radioactivity that a working fusion reactor will give off. This too will depend upon its design, and will remain vague as long as the design remains vague. The most favourable guesses say that fusion, which involves radioactive gases and makes surrounding machinery radioactive by bombarding it with hurtling neutrons, could produce waste up to 100,000 times less radioactive than fission. Others say it will be only 100 times better, which, given fusion's cost, would reduce its appeal.

Until answers to these questions become clearer, fusion remains just another research project, best known for its grand aim, but actually more important for the quest involved.

Taken from The Economist

BLURBS

Energy, Mines and Resources Canada will contribute $1 million to the committee responsible for organizing the 14th Congress of the World Energy Conference (WEC '89).

The conference, which will be held in Montreal from September 11 - 23 is expecting to attract private sector executives, government policy makers, academics and many other groups involved in the energy industry.

WEC '89 will give Canada the chance to show off its many examples of energy technology, engineering services and strong concern for the environment.

The last World Energy Conference, held in Cannes, France in 1986, attracted 3,000 delegates.

Quebec is about to announce a massive recycling project that will see Montreal Urban Community (MUC) residents sorting rubbish before it is collected.

Under the plan, which will be unveiled in about three weeks, MUC residents would place glass products, metal cans, newspapers and other rubbish in separate containers. The containers then would be placed in special bins to assist recycling after collection.

The glass, metal cans and newspapers would be sent to recycling firms, reducing by about 15 per cent the amount of garbage dumped in landfill or sent to the city of Montreal's incinerator.

Condensed from an article in The Montreal Gazette

There are now 92 members of the Energy Educators of New Brunswick. Although not all of our members are teachers, the majority are, with even teachers from as far away as British Columbia and Germany having joined our organization.

Three-quarters of EENB's membership is comprised of secondary school teachers, while elementary and university teachers make up about 10 per cent of the membership. Remaining members are educators in the public and private sectors who have a keen interest in energy education in New Brunswick.

EENB has representatives in many of the provinces 42 school districts. We have members in almost 65 per cent of the French school districts and over 70 per cent of the English school districts.

If you are interested in energy conservation and would like to become a members of EENB, then complete and return the following form.

MEMBERSHIP APPLICATION FORM

Membership fee $10.00 payable to Energy Educators of New Brunswick

NAME_____

HOME ADDRESS_____

_____POSTAL CODE_____

NAME OF SCHOOL/ORGANIZATION_____

GRADE LEVEL/SUBJECT TAUGHT_____

HOME TEL._____ BUSINESS TEL._____

Mail coupon and fee to:

EENB
P.O. Box 1542, Station A, Fredericton, NB E3B 5G2
(506) 450-1581

New Brunswick
Nouveau-Brunswick

Canada